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EGG-SHELL THICKNESS IN PHEASANTS GIVEN DIELDRIN¹

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Abstract: For 10 weeks, penned breeding hen pheasants (*Phasianus colchicus*) were given one capsule per week containing either lactose or lactose and 4, 0, or 10 mg technical grade dieldrin. Under the conditions of this experiment, no significant differences ($P > 0.05$) in eggshell thickness were found between any of the control and dieldrin groups.

A relationship between DDT in the diet and eggshell thickness in birds of prey has been postulated (Hickey and Anderson 1968). Porter and Wiemeyer (1969) reported that DDT and dieldrin added to diets decreased the thickness of sparrow hawk (*Falco sparverius*) eggshells. Anderson et al. (1969) reported a relationship with *p,p'*-DDE and polychlorinated biphenyls and

eggshell thickness in cormorants (*Phalacrocorax auritus*). In the winter and spring of 1969, in order to determine any relationship between dieldrin and eggshell thickness, we fed this insecticide to penned hen pheasants. Each week, capsules containing known amounts of dieldrin were administered to the birds.

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METHODS AND PROCEDURES

Pheasants used in this experiment were first generation breeders purchased from

Table 1. Mean pheasant eggshell thickness \pm standard deviation in mm for control and dieldrin groups.

TREATMENT GROUPS (MG DIELDRIN WEEKLY)	HATCHED EGGS				UNHATCHED EGGS	
	Number of Eggs	Shell Thickness in First 8 Weeks	Number of Eggs	Shell Thickness in Last 7 Weeks	Number of Eggs	Shell and Membrane Thickness in Last 6 Weeks
First Generation:						
0	181	0.24 ± 0.02	138	0.23 ± 0.01	119	0.31 ± 0.03
6	125	0.24 ± 0.02	70	0.24 ± 0.03	95	0.32 ± 0.03
10	130	0.24 ± 0.02	40	0.24 ± 0.02	131	0.31 ± 0.03
Second Generation:						
0-0*	89	0.24 ± 0.02	68	0.25 ± 0.02	53	0.33 ± 0.03
6-0	95	0.25 ± 0.01	47	0.24 ± 0.03	71	0.33 ± 0.03
6-6	129	0.25 ± 0.02	47	0.24 ± 0.02	45	0.32 ± 0.02
10-0	33	0.25 ± 0.02	14	0.25 ± 0.02	40	0.33 ± 0.03

* The first number represents mg dieldrin given weekly to parents the previous year, the second represents mg dieldrin given to hens per week in this study.

the South Dakota Pheasant Co., Canton, in the winter of 1969, and second generation birds raised from hens and cocks which had been purchased from Ringneck Ranch, Frederick, South Dakota and in a previous experiment during the winter and spring of 1968, had been given weekly doses of 4, 6, or 10 mg dieldrin for 17 weeks. In our experiment, 10 weekly doses of technical grade dieldrin, in No. 5 gelatin capsules, mixed with lactose, were administered to breeding stock; lactose placebo capsules were given to control birds. Based on average food consumption for 1 week, a 6-mg capsule would correspond to about 20 ppm in the diet (Baxter et al. 1969). General care, diet, and maintenance of the breeding stock was the same as described for an earlier experiment by Baxter et al. (1969).

Beginning 1 week after hens were given their first capsule, eggs were gathered daily and set weekly in a forced draft incubator. The shell of each hatched egg without its membrane was measured at three points around a midline which was perpendicular to the long axis. Unhatched eggs from the last 6 weeks were broken, drained, and after drying for 24 hours, measured at three

points; measurements included both shell and membrane. Using an Ames micrometer, measurements were made to the nearest 0.01 mm. Our methods of making eggshell measurements were similar to those used by Greeley (1962), except that he measured four times in the middle and on ends of each egg.

RESULTS AND DISCUSSION

Egg measurement data were divided into those from the first 8 weeks and the last 7 weeks (Table 1). From these data it is evident that eggshell thickness was not affected by the dieldrin treatment. Unhatched eggs from the last 6 weeks were measured, and it was determined that no differences existed among eggs from control or dieldrin groups. No significant differences ($P > 0.05$) were detected between any groups for either first or second generation pheasants in our study. Although dieldrin is a chlorinated hydrocarbon like DDT, in this experiment it apparently did not affect calcium deposition during egg production. However, the lack of effects from dieldrin may be due to the species tested rather than the chemical used.

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